

UNITED STATES DISTRICT COURT FOR
THE NORTHERN DISTRICT OF TEXAS
DALLAS DIVISION

VEX ROBOTICS, INC.

Plaintiff,

v.

CROSS THE ROAD ELECTRONICS, LLC,

Defendant.

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CIVIL ACTION NO. 3:23-cv-02586-D

PLAINTIFF VEX ROBOTICS, INC.'S SECOND AMENDED COMPLAINT

Plaintiff VEX Robotics, Inc. files its second amended complaint against Defendant Cross the Road Electronics, LLC (CTRE), and in support thereof alleges the following:

I. PARTIES

1. Plaintiff VEX Robotics, Inc. (VEX) is a Texas corporation with its principal place of business at 6725 W. FM 1570, Greenville, Hunt County, Texas 75402. VEX has appeared in this lawsuit.

2. Defendant Cross the Road Electronics, LLC (CTRE) is a Michigan limited liability company with its principal place of business at 16065 Leone Drive, Macomb Township, Macomb County, Michigan 48042. CTRE has appeared in this lawsuit.

II. JURISDICTION AND VENUE

3. This Court has subject matter jurisdiction over Plaintiff's claims under 18 U.S.C. § 1331 and 28 U.S.C. § 1338(b) and has supplemental jurisdiction over all other related state law claims under 28 U.S.C. § 1367(a). Venue is proper under 28 U.S.C. § 1391(2) because the facts giving rise to the acts or omissions alleged herein took place in part in this district.

III. FACTUAL BACKGROUND

4. VEX is a leading supplier of educational and competition robotics products in the United States and internationally.

5. CTRE develops software and hardware components for use in educational and competition robotics products.

6. On April 22, 2014, VEX and CTRE signed a written partnership contract with an effective date of April 21, 2014, a true and correct copy of which is attached hereto as Exhibit 1 (Partnership Contract). Under the Partnership Contract, the parties agreed to jointly develop two new electronic speed controllers specifically designed to be used with educational robots by robotics teams in the annual US Foundation for the Inspiration and Recognition of Science and Technology (FIRST) Robotics Competition (FIRST Robotics Competition). The FIRST Robotics Competition is an international high school robotics competition where teams of high school students are challenged to build industrial-size robots and compete in various events.

7. Under the Partnership Contract, VEX and CTRE agreed to be jointly responsible for designing and engineering the controllers, to participate in formal and informal design reviews, and to conduct their transactions by electronic means. They specifically agreed that CTRE would take the lead in electrical detail design while VEX would lead in mechanical detail design, sourcing, and manufacture engineering. The parties also agreed that the software design would be jointly developed, but CTRE would lead all Controller Area Network (CAN) communication protocol development. They also agreed to jointly develop test fixtures. The parties agreed that during engineering prototype, pre-production, and production start phases of manufacturing, both CTRE and VEX would need to sign off on all approval of samples. They also agreed to jointly approve supplier quotes before incurring any non-recurring or recurring manufacturing costs.

8. The two brushed motor controllers the parties designed and developed under the Partnership Contract were called the Victor SP (later updated to the Victor SPX) and the Talon SRX.

9. Under the Partnership Contract, the parties agreed that the controllers could be sold to any customer for purposes of resale, provided that the controllers were sold at a mutually agreed upon price to a company not affiliated with VEX or CTRE and who executed an exclusive distribution agreement approved by both parties. VEX and CTRE also agreed to share all product profit and manufacturing costs equally. The parties specifically agreed that CTRE would pay 50% of all manufacturing costs.

10. The Partnership Contract had an initial three-year term from April 2014 to April 2017. The parties agreed that the initial term would automatically extend for up to five, one-year extensions, unless a party provided the other party written notice of termination before the contract renewed. The parties also agreed that the Partnership Contract could be altered or amended but any amendments, alterations or additions to the Partnership Contract would have to be in writing and executed by each party's duly authorized representative.

11. The parties further agreed that upon termination of the Partnership Contract, the parties would use commercially reasonable efforts to wind down their collaborative efforts. The parties agreed that—at the time of termination—either party could sell the controllers in their inventory or in the process of manufacturing or delivery.

12. The Partnership Contract contemplated that any intellectual property created during the development of the “Developed Product” would be jointly owned by both parties. In the Partnership Contract, the parties expressly agreed:

12.3. VEX and CTRE acknowledge that any intellectual property created during the development of the Developed Product is owned equally by VEX and CTRE including, but not limited to, all CAD data, design drawings, manufacturing drawings, fixture drawings, tooling, fixtures, firmware, embedded software, application software, and software tools for use on Developed Product only.

The term “Developed Product” is not defined in the Partnership Contract. The parties agreed that upon termination of the Partnership Contract, both parties could continue to manufacture and sell the “Developed Product” for their own commercial reasons.

13. Neither party provided any notice of termination during the term of the Partnership Contract. Therefore, the contract automatically renewed and remained in effect until its expiration on April 30, 2022.

14. Even after the Partnership Contract expired on April 30, 2022, VEX and CTRE agreed to continue working together under its terms. The terms of the expired contract did not prevent the parties from reaching a modified written agreement structured on the same provisions as the old one.

15. Beginning in 2015, VEX and CTRE began discussions about building a “brushless” motor that could be used with robots developed for the Robotics Competition. Brushless motors are far superior to “brushed” motors because they are versatile, quiet, efficient, and require less maintenance.

16. The parties agreed to modify the Partnership Contract and jointly develop a new “Developed Product”—a brushless motor called the Falcon 500 motor specially designed for the FIRST Robotics Competition. VEX agreed to lead the mechanical detail design, sourcing, and manufacture engineering for the Falcon 500 motor. CTRE agreed to take the lead in electrical detail design, software design, CAN communication protocol development, and test fixtures for

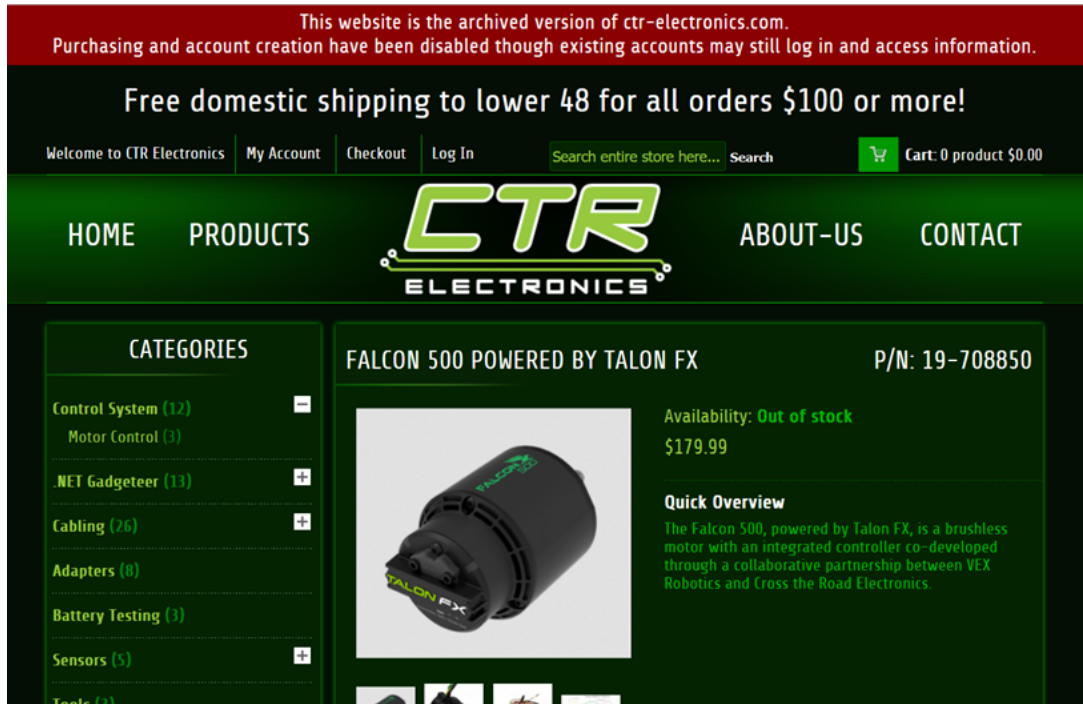
the Falcon 500 motor. The parties agreed to be jointly responsible for designing and engineering the Falcon 500 motors and to participate in formal and informal design reviews. VEX was responsible for manufacturing the Falcon 500 motor based on the design jointly created by VEX and CTRE.

17. CTRE and VEX agreed that they would equally share the profits and manufacturing costs of designing, developing, and manufacturing the Falcon 500 motors. CTRE and VEX also agreed that any intellectual property created during the development of the Falcon 500 motors would be jointly owned by CTRE and VEX, including all CAD data, design drawings, manufacturing drawings, fixture drawings, tooling, fixtures, firmware, embedded software, application software, software tools, and source code. On information and belief, the software associated with the Falcon 500 motor includes (i) the firmware embedded in the integrated brushless motor controller (referred to as the Talon FX) (ii) the applications customers use to update the Falcon 500's internal processor or adjust the settings of the motor and (iii) the larger software ecosystem which allows users to program their robots, which must successfully “talk to” the Falcon 500 motor (collectively, the Software).

18. CTRE and VEX agreed that the Falcon 500 motors could be sold by either party without the other party's permission provided the selling party paid the other party its 50% share of the net profits earned from each sale. Finally, the parties agreed that upon termination of the Partnership Contract as modified, both parties could continue to manufacture and sell the “Developed Product” for their own commercial reasons and without sharing any profits from the sale of the Falcon 500 motor.

19. The parties' modification of the Partnership Contract is memorialized in multiple writings, which were published and exchanged between CTRE and VEX. For example, in late 2019 or early 2020, CTRE's authorized representative acted by writing and publishing the

following statement in an electronic record on CTRE's official website: "*The Falcon 500*, powered by Talon FX, *is a brushless motor* with an integrated controller *co-developed through a collaborative partnership between VEX Robotics and Cross the Road Electronics.*"¹ (Emphasis added). CTRE's archived webpage is depicted below:



20. CTRE's written statement about the partnership between VEX and CTRE relating to the Falcon 500 motor is contained on webpage archived by CTRE at <http://oldsite.ctr-electronics.com/talon-fx.html> (last visited April 25, 2024). CTRE publicly displayed this webpage on CTRE's official website from 2020 through at least 2021.²

21. CTRE's authorized representative also wrote and published in an electronic record on CTRE's current official website the following statement: "*The Falcon 500* powered by Talon

¹ Cross the Road Electronics is referred to as CTRE in this complaint.

² <https://web.archive.org/web/20220120135420/https://store.ctr-electronics.com/falcon-500-powered-by-talon-fx/> (last visited April 25, 2024).

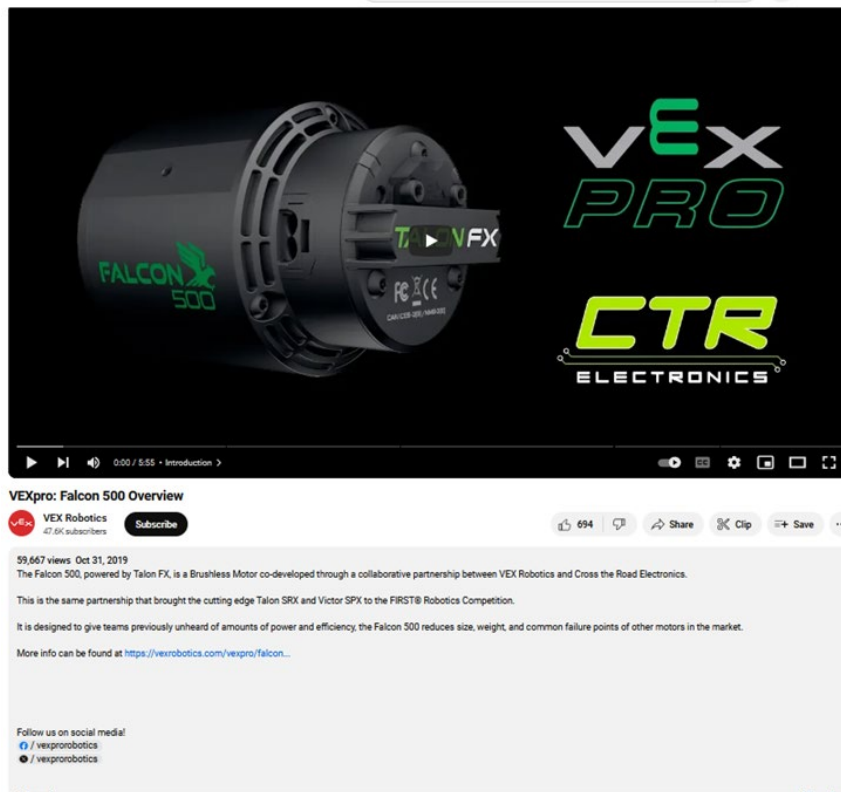
FX *is a brushless motor* with an integrated motor controller and high-resolution encoder, *custom designed* specifically for the FIRST Robotics Competition, *through a collaboration between Cross the Road Electronics and VEX Robotics.*”³ (Emphasis added). On information and belief, the content of CTRE’s website cannot be changed without the use of unique credentials attributed to an authorized person at CTRE who holds those credentials or an independent contractor retained by CTRE who holds those credentials.

22. Likewise, on or about October 31, 2019, VEX’s authorized representative acted by writing and publishing the following statement in an electronic record in the video description on VEX’s official YouTube Channel: “*The Falcon 500, powered by Talon FX, is a Brushless Motor co-developed through a collaborative partnership between VEX Robotics and Cross the Road Electronics. This is the same partnership that brought the cutting edge Talon SRX and Victor SPX to the FIRST® Robotics Competition.*”⁴ (Emphasis added). The content of VEX’s YouTube Channel cannot be changed without the use of unique credentials attributed to an authorized person at VEX who holds those credentials or an independent contractor retained by VEX who holds those credentials.

³ <https://store.ctr-electronics.com/falcon-500-powered-by-talon-fx/> (last visited April 26, 2024).

⁴ <https://www.youtube.com/watch?v=NPxq60JhGM4> (last visited April 25, 2024).

23. VEX's YouTube video and description is depicted below:



24. In the YouTube video, the narrator states:

In the past few years, *the collaborative partnership between VEX Robotics and Cross the Road Electronics has produced some of the most popular motor controllers* in the FIRST Robotics Competition, including the Talon SRX and the Victor SPX. . . . *The Falcon 500* powered by Talen FX *is the latest cutting-edge product brought to you by VEX Robotics and Cross the Road Electronics*. . . . On behalf of VEX Robotics and Cross the Road Electronics, thanks for watching and *please visit our website for more information*.⁵

25. After VEX published its YouTube video and description about the existence of the “collaborative partnership” between VEX and CTRE regarding the Falcon 500 motor, CTRE’s authorized representative acted by embedding VEX’s video into an electronic record on CTRE’s

⁵ *Id.* at timestamps 0:14, 4:47, and 5:44.

official website.⁶ CTRE accepted VEX's memorialization of the modification to the Partnership Contract by embedding VEX's video on CTRE's active website.⁷

26. VEX's authorized representative likewise acted by writing and publishing the following statement in an electronic record on VEX's official website: "***The Falcon 500***, powered by Talon FX, ***is a Brushless Motor co-developed through a collaborative partnership between VEX Robotics and Cross the Road Electronics. This is the same partnership that brought the cutting edge Talon SRX and Victor SPX to the FIRST® Robotics Competition.***"⁸ (Emphasis added). The content of VEX's official website cannot be changed without the use of unique credentials attributed to an authorized person at VEX who holds those credentials or an independent contractor retained by VEX who holds those credentials.

27. By acting to write and embed virtually identical statements about the parties' modification to the Partnership Contract into each other's electronic records, VEX and CTRE executed a written modification to the Partnership Contract, true and correct copies of which are attached hereto as Exhibits 2, 3, 4, and 5 (Modified Partnership Contract). CTRE and VEX modified the original Partnership Contract by including motors as a "Developed Product," by substituting the word "controllers" with "motors," and by extending the contract's term. Because no time for performance was agreed to by the parties, a reasonable time will be implied on the basis of all the circumstances surrounding the agreement, the situation of the parties, and the subject matter of the agreement. CTRE and VEX executed the Modified Partnership Contract by

⁶ <https://store.ctr-electronics.com/falcon-500-powered-by-talon-fx/> (last visited April 25, 2024).

⁷ *Id.*

⁸ <https://www.vexrobotics.com/217-6515.html> (last visited April 25, 2024).

means of symbol or process attached to or logically associated with a record and executed or adopted by each party with the intent to sign the record.

28. In October 2019, the parties began pre-selling the Falcon 500 motors, and VEX began shipping them in January/February 2020 for the 2020 FIRST Robotics Competition season. Customers who purchased the Falcon 500 motor were granted a royalty-free license to use the Software.⁹

29. The Falcon 500 motor itself is branded with website information for both VEX (vexrobotics.com) and CTRE (ctr-electronics.com), as depicted below:



30. The Falcon 500 User Guide was accessible to customers on the websites for VEX and CTRE. The November 1, 2019 Falcon 500 Motor User Guide states that “[t]he ***Falcon 500*** is ***a brushless motor, custom designed*** specifically for the FIRST Robotics Competition, ***through a***

⁹ On information and belief, beginning in 2024, CTRE began charging customers a licensing fee to use the Software.

collaboration between VEX Robotics and Cross the Road Electronics.”¹⁰ (Emphasis added).

Each and every page of the Falcon 500 User Guide contains the website address for VEX (vexpro.com) and CTRE (ctr-electronics.com).

31. The Falcon 500 became a very successful product within the educational robotics community and is used by educational robotics teams around the world. Based on the partnership publicly announced by VEX and CRTE, many on-line sellers and distributors of the Falcon 500 motor began promoting this partnership to its customers. For example, WestCoast Products & Design, LLC (WestCoast) announced on its website: “***The Falcon 500***, powered by Talon FX, ***is a Brushless Motor co-developed through a collaborative partnership between VEX Robotics and Cross the Road Electronics.*** This is the ***same partnership*** that brought the cutting edge Talon SRX and Victor SPX to the FIRST® Robotics Competition.”¹¹ (Emphasis added). AndyMark, another on-line seller of robotics accessories, stated on its website: “***The Falcon 500***, powered by Talon FX, ***is a Brushless Motor co-developed through a collaborative partnership between VEX Robotics and Cross the Road Electronics.*** This is the ***same partnership*** that brought the cutting edge Talon SRX and Victor SPX to the FIRST® Robotics Competition.”¹² (Emphasis added). An Israeli company called Robot also stated on its website: “***The Falcon 500*** powered by Talon FX ***is a brushless motor*** with an integrated motor controller and encoder, ***custom designed*** specifically for the FIRST Robotics Competition, ***through a collaboration between Cross the Roads Electronics and VEX Robotics.***”¹³ (Emphasis added).

¹⁰ <chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://store.ctr-electronics.com/content/user-manual/Falcon%20500%20v3%20User%27s%20Guide.pdf> (last visited April 29, 2024).

¹¹ <https://wcproducts.com/products/brushless-motors> (last visited April 25, 2024).

¹² <https://www.andymark.com/products/falcon-500> (last visited April 25, 2024).

¹³ <https://www.saad-robot.com/product-page/falcon-500-powered-by-talon-fx> (last visited April 25, 2024).

32. These and other similar written statements were made by CTRE, VEX, dealers, other on-line sellers, and customers about the existence of a partnership between VEX and CTRE relating to the Falcon 500 motor. CTRE remained silent and never corrected the record.

33. Until mid-2023, VEX and CTRE continued to work together in designing products and manufacturing and selling the Falcon 500. VEX generated millions of dollars in revenue from its sale of the Falcon 500 motors. Under the Modified Partnership Contract, VEX paid CTRE hundreds of thousands of dollars each year. VEX had no reason to believe that its partnership relationship with CTRE was in jeopardy. VEX thus continued to manufacture the Falcon 500 motor with the expectation that CTRE would share in manufacturing costs and profits.

34. On July 11, 2023, CTRE's Chief Operating Officer, John V-Neun, suddenly and without warning sent VEX's Chief Executive Officer, Tony Norman, an e-mail announcing that CTRE was "not willing to continue to license [CTRE's] IP for any additional production runs of the Falcon 500" and was "not interested in licensing [CTRE's] IP" to VEX for "future products." Mr. V-Neun's email effectively terminated the Modified Partnership Contract.

35. At the time CTRE terminated the Modified Partnership Contract, VEX had thousands of Falcon 500 motors in the manufacturing process and component parts specially ordered at a cost to VEX of over \$500,000. After CTRE's termination, VEX fully expected that CTRE would share in the production costs associated with VEX's remaining inventory of Falcon 500 motors and that VEX could sell these "Developed Products" for its own commercial reasons without sharing any profits with CTRE as the parties agreed under the Modified Partnership Contract. John V-Neun's e-mail, however, cast serious doubt on VEX's ability to recover CTRE's share of the manufacturing costs associated with the Falcon 500 motors and VEX's ability to continue to sell the Falcon 500 motors incorporating the intellectual property jointly owned by VEX and CTRE.

36. Later, CTRE prevented VEX's customers from utilizing the Software specially designed to enable its customers to operate the Falcon 500 motors.. By denying access to the Software, CTRE effectively took the Falcon 500 units off the market resulting in their obsolescence and reputational damage to the units' future sales. CTRE purposely prevented VEX from recouping its investment, thwarted VEX's ability to sell the Falcon 500 motor, and irreparably damaged VEX's reputation in the FIRST market.

37. Unbeknownst to VEX and during the VEX/CTRE partnership relationship, CTRE and WestCoast (a competitor of VEX) entered into a competing business relationship. Between March and October 2023, CTRE and WestCoast began designing a competitive brushless motor called the Kraken X60, as depicted below:



Like the Falcon 500 motors, the Kraken X60 motors were designed and marketed to school robotics teams for the FIRST Robotics Competition. On or about October 12, 2023, WestCoast

and CTRE announced the creation of the Kraken X60 motor to the educational robotics community and began accepting pre-orders.¹⁴

38. Despite demand, CTRE has failed and refused to reimburse VEX for CTRE's share of the manufacturing costs and expenses for the Falcon 500 motors or allow VEX or its customers to access the Software to operate the motors.

IV. CLAIMS

Count One – Promissory Estoppel

39. VEX incorporates by reference the foregoing paragraphs.

40. CTRE promised VEX that CTRE and VEX would jointly develop the Falcon 500 motor specially designed for the FIRST Robotics Competition. CTRE promised VEX that CTRE and VEX would equally share the profits and manufacturing costs of designing, developing, and manufacturing the Falcon 500 motors. CTRE also promised VEX that any intellectual property created during the development of the Falcon 500 motor would be jointly owned by CTRE and VEX, including all CAD data, design drawings, manufacturing drawings, fixture drawings, tooling, fixtures, firmware, embedded software, application software, software tools, and source code. Finally, CTRE promised VEX that the Falcon 500 motors could be sold without CTRE's consent so long as VEX accounted for and paid CTRE its 50% share of the net profits from each sale.

41. Given the earlier course of dealings between CTRE and VEX regarding electronic speed controllers co-developed and sold by CTRE and VEX for the eight-year period from April 21, 2014 to April 30, 2022, VEX had the right to expect CTRE's performance with respect to

¹⁴ See <https://www.chiefdelphi.com/t/announcing-kraken-x60-powered-by-talon-fx/442236/36>, <https://store.ctr-electronics.com/announcing-kraken-x60/> and <https://wcproducts.com/products/kraken> (last visited April 25, 2024).

future jointly “Developed Products” under the Partnership Contract. It was, therefore, foreseeable that VEX would rely on CTRE’s promises. CTRE, by its words and conduct, led VEX to do what it otherwise would not have done. But for CTRE’s promises, VEX would not have taken substantial steps to create, develop, fund, and manufacture the Falcon 500 motors. In reliance on CTRE’s promises and with CTRE’s knowledge and encouragement, VEX incurred substantial expenses in manufacturing and making preparations to engage in the business of selling the Falcon 500 motors. VEX reasonably and substantially relied on CTRE’s promises to its detriment by designing and manufacturing thousands of Falcon 500 motors and ordering hundreds of component parts at a cost to VEX of over \$500,000. If CTRE did not intend for VEX to rely on its promises, CTRE had a duty to speak but remained silent.

42. CTRE later broke its promises to VEX. Although VEX incurred the cost and expense for the joint venture, CTRE failed and refused to reimburse VEX for CTRE’s share of the costs incurred by VEX. And CTRE prevented VEX customers from utilizing the Software specially designed to enable consumers to operate the Falcon 500 motors. By denying access to the Software, CTRE effectively took the Falcon 500 units off the market resulting in their obsolescence and reputational damage to the units’ future sales. CTRE thus thwarted VEX’s ability to sell the Falcon motors to recoup its costs. Injustice can be avoided only by enforcing CTRE’s promise. As a result of VEX’s reliance on CTRE’s promises, VEX sustained reliance damages for moneys it expended in manufacturing and preparing to engage in the business of selling Falcon 500 motors, for which VEX now sues.

Count Two – Breach of Contract

43. VEX incorporates by reference the foregoing paragraphs.

44. VEX and CTRE entered into a valid and enforceable Modified Partnership Contract. In the alternative, the parties entered into partnership implied from and evidenced by

the parties' words and conduct in the light of surrounding circumstances, including the parties' earlier course of dealings. CTRE and VEX received or had the right to receive a share of the profits of the partnership, they expressed an intent to be partners in the partnership, they each participated in or had the right to participate in the control of the partnership and had a mutual right of control, they agreed to share profits and losses of the partnership, and they agreed to contribute money or property to the partnership.

45. VEX and CTRE entered into a Modified Partnership Contract structured on the same provisions as the old one. Based on the Modified Partnership Contract as well as what the parties said and did and in light of the surrounding circumstances, CTRE and VEX agreed that they would jointly develop a new "Developed Product"—called the Falcon 500 motor—specially designed for the FIRST Robotics Competition. CTRE and VEX agreed that they would equally share the profits and manufacturing costs of designing, developing, and manufacturing the Falcon 500 motors. CTRE and VEX agreed that any intellectual property created during the development of the Falcon 500 motor would be jointly owned by CTRE and VEX, including all CAD data, design drawings, manufacturing drawings, fixture drawings, tooling, fixtures, firmware, embedded software, application software, software tools, and source code. CTRE and VEX agreed that the Falcon 500 motors could be sold by either party without the other party's permission provided the selling party paid the other party its 50% share of the net profits earned from each sale. Finally, upon termination of the Modified Partnership Contract, the parties were not obligated to share any profits in connection with the sale of the Falcon 500 motors.

46. For an eight-year period—from April 21, 2014 to April 30, 2022—CTRE and VEX engaged in a similar course of dealing and business arrangement regarding electronic speed controllers co-developed and sold by CTRE and VEX. CTRE and VEX executed a written modification to the original Partnership Contract that was modeled on the same provisions as the

old one. Under the parties' Modified Partnership Contract, CTRE and VEX agreed to modify their original Partnership Contract by including motors as a "Developed Product," by substituting the word "controllers" with "motors," and by extending the contract's term. Because no time for performance was agreed to by the parties, a reasonable time will be implied on the basis of all the circumstances surrounding the agreement, the situation of the parties, and the subject matter of the agreement. In the alternative, the parties entered into a partnership agreement implied from and evidenced by the parties' words and conduct, including their earlier course of dealing.

47. Under the Modified Partnership Contract, CTRE agreed to take the lead in the motor's electrical and software design of the Falcon 500 motors. VEX agreed to take the lead on the mechanical design, sourcing, and engineering. Once the motors were designed and manufactured by VEX and CTRE, the parties agreed that VEX could sell the motors with the accompanying Software to prospective customers and then equally share the net profits earned from those sales. The parties' partnership agreement is supported by consideration because the parties performed acts that were a detriment to one party and a benefit to the other.

48. In reliance on CTRE's promises and with CTRE's knowledge and encouragement, VEX partially performed and solely incurred substantial expenses in manufacturing and in making preparations to engage in the business of selling the Falcon 500 motors. VEX designed and manufactured thousands of Falcon 500 motors and ordered hundreds of component parts at a cost to VEX of over \$500,000. CTRE, on the other hand, also partially performed by creating the specialized and customized Software used to operate the Falcon 500 motors and delivered portions of it to VEX who requested it. Partial performance by both VEX and CTRE indicates that an actual contract was made with no other design than to fulfill each of their contractual obligations. In other words, the purpose of the parties' partial performance was to fulfill the contract and is corroborative of the fact that a contract actually was made.

49. In addition, CTRE knew the purpose for which VEX intended to use the Software. CTRE intended that VEX distribute the Software to customers who purchased the Falcon 500 motors. Under the Modified Partnership Contract, the parties agreed to jointly own the Software used to operate the Falcon 500 motors. VEX reasonably and substantially relied on CTRE's promises to its detriment by designing, funding, and manufacturing thousands of Falcon 500 motors and ordered hundreds of component parts at a cost to VEX of over \$500,000. If CTRE did not intend for VEX to rely on its promises about a partnership relationship, CTRE had a duty to speak but remained silent.

50. As an alternative argument to the parties' joint ownership of the Software, CTRE granted VEX and its customers a nonexclusive oral or implied license permitting VEX and its customers to copy and use the Software to operate the Falcon 500 motors, which became irrevocable with consideration. CTRE engaged in conduct that could reasonably be perceived as signifying consent to the use of the Software by VEX and its customers. CTRE created the Software at the request of VEX who intended to use the Software for the Falcon 500 motors. CTRE delivered a copy of a portion of the Software to VEX without any caveats or limitations on its use. CTRE understood and intended that VEX distribute the Software when it sold the Falcon 500 motors. CTRE's installation of its Software on VEX's Falcon 500 motors manifested its objective intent, at the time of creation, to grant VEX and its customers a license. In fact, CTRE conceded in a July 11, 2023 email that it granted VEX some form of license to the intellectual property associated with the Falcon 500 motor and attempted to revoke it. CTRE's belated attempt to revoke the license is insufficient to negate all other objective manifestations of its intent to grant VEX and its customers an unlimited, non-exclusive oral or implied license to copy and use the Software to operate the Falcon 500 motors.

51. From 2015 to 2023, VEX substantially relied on the parties' joint ownership of the intellectual property under the Modified Partnership Contract or, in the alternative, CTRE's intent to license the Software to VEX and its customers based on an oral or implied license. VEX invested significant funds in the creation, design, development, and manufacture of the Falcon 500 motors. During those eight years, CTRE also created, designed, and developed the Software used in connection with the Falcon 500 motors. The parties intended to sell these motors and the accompanying Software to customers for their mutual benefit. CTRE made no objection to VEX's intended use of the Software. The parties' mutuality of obligation and bargained-for exchange of promises is sufficient consideration to render CTRE's alternative grant of a non-exclusive license to VEX and its customers irrevocable. Thus, based on the totality of the parties' conduct indicating an intent to grant such permission, VEX obtained an irrevocable, non-exclusive oral or implied license to copy and use the Software in all ways necessary to further the purpose for which the Software was created: For VEX to sell the Falcon 500 motors with the accompanying Software to customers who could then copy and use the Software to operate the motors. This alternative irrevocable, non-exclusive oral or implied license would have been freely transferrable to VEX's customers who purchased the Falcon 500 motor.

52. VEX fully performed its contractual obligations under the terms of the Modified Partnership Contract. CTRE, however, materially breached the parties' agreement or in the alternative materially breached the oral or implied license. Although VEX incurred substantial costs and expenses for the joint venture, CTRE failed and refused to reimburse VEX for CTRE's share of the costs incurred by VEX. And in material breach of the parties' agreement, or in the alternative material breach of the oral or implied license, CTRE prevented VEX customers from utilizing the Software specially designed to enable consumers to operate the Falcon 500 motors thwarting VEX's ability to sell the Falcon motors to recoup its costs and earn a profit. By denying

access to the Software, CTRE effectively took the Falcon 500 units off the market resulting in their obsolescence and reputational damage to the units' future sales. These units are now worthless as Falcon 500 motors. As a result of CTRE's material breach of the parties' agreement, or in the alternative material breach of the oral or implied license, VEX sustained reliance damages for funds it expended in manufacturing and preparing to engage in the business of selling Falcon 500 motors or in the alternative actual, compensatory and special damages for its profits from the lost sale of the motors, for which VEX now sues.

Count Three—Breach of Fiduciary Duty

53. VEX incorporates by reference the foregoing paragraphs.

54. As a result of the partnership agreement, a fiduciary relationship existed between VEX and CTRE. As a fiduciary, CTRE owed VEX a duty of loyalty to the partnership, duty of the utmost good faith, fairness, and honesty in dealings with each other in matters pertaining to the partnership, a duty to account for all partnership profits and property, a duty to make the assets of the partnership productive, and a duty to refrain from competition with the partnership. CTRE breached its fiduciary duty to VEX by (i) failing and refusing to pay its proportionate share of the costs and expenses in creating, developing, and manufacturing the motors, (ii) refusing to allow VEX and its customers to use the Software, (iii) conspiring with WestCoast to unfairly compete with the partnership, and (iv) usurping a partnership opportunity for its own personal gain. CTRE's breach resulted in substantial injury to VEX and a benefit to CTRE. As a result of CTRE's breach of its fiduciary duties, VEX suffered compensatory, actual, and special damages, for which it now sues.

Count Four—Unfair Competition

55. VEX incorporates by reference the foregoing paragraphs.

56. CTRE engaged in unfair competition by conducting business contrary to honest practice in industrial or commercial matters. CTRE converted the parties' jointly-owned Software and breached its fiduciary duties to VEX. As a result of CTRE's unfair competition, VEX incurred compensatory, actual, and special damages, for which it now sues.

Count Five – Conversion

57. VEX incorporates by reference the foregoing paragraphs.

58. CTRE converted the jointly-owned software. VEX owned or had legal possession of the Software or entitlement to its possession. CTRE unlawfully and without authorization assumed and exercised dominion and control over the Software to the exclusion of, or inconsistent with VEX's rights as a co-owner. VEX demanded the return of the Software so it could be used in conjunction with the Falcon 500 motors by its customers. CTRE refused to return or allow VEX or its customers to access the Software. CTRE's acts amount to a clear repudiation of VEX's rights. As a result, VEX incurred compensatory, actual, and special damages, for which it now sues.

Count Six—Trespass to Chattels

59. VEX incorporates by reference the foregoing paragraphs.

60. CTRE wrongfully interfered with VEX's use or possession of the Software required to operate the Falcon 500 motors, depriving VEX of its use for a substantial period of time.

61. As a result of CTRE's wrongful interference, VEX incurred compensatory, actual, and special damages, for which it now sues.

Request for exemplary damages

62. Pursuant to Chapter 41 of the Texas Civil Practice & Remedies Code, VEX seeks an award of exemplary damages against CTRE. CTRE engaged in malicious conduct and intended

to cause substantial injury or harm to VEX by converting the Software, breaching its fiduciary duties, and engaging in unfair competition.

Request for Attorney's Fees

63. As a result of CTRE's breach of the parties' agreement, VEX was forced to retain counsel to file a lawsuit to assert its claims against CTRE. VEX properly presented its claim to CTRE but CTRE failed and refused to make payment for the just amount owed to VEX before the expiration of the 30th day after the claim was presented. Thus, VEX requests that this Court award reasonable and necessary attorney's fees under 38.001 of the Texas Civil Practice & Remedies Code.

JURY DEMAND

64. Plaintiff hereby demands a trial by jury for all triable issues alleged in this Complaint.

PRAYER

For the reasons stated, Plaintiff VEX Robotics, Inc. respectfully prays that this Court enter a final judgment against Defendant Cross the Road Electronics, LLC awarding damages and relief as follows:

1. actual, compensatory, special, and exemplary damages;
2. reasonable and necessary attorney's fees;
3. court costs;
4. pre- and post-judgment interest at the maximum rate allowable by law; and
5. such other and further relief to which VEX may be justly entitled.

Respectfully submitted,

/s/ Joseph F. Cleveland, Jr.

Joseph F. Cleveland, Jr.
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ATTORNEYS FOR VEX ROBOTICS, INC.

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing document was sent to all parties and counsel of record, pursuant to the Federal Rules of Civil Procedure, addressed as follows:

Scott L. Harper
Scott.Harper@harperbates.com
Jordyn E. Hendrix
Jordyn.Hendrix@harperbates.com

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COUNSEL FOR DEFENDANT/COUNTER-PLAINTIFF
CROSS THE ROAD ELECTRONICS, LLC

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COUNSEL FOR DEFENDANT
JONATHAN JACK

/s/ Joseph F. Cleveland, Jr.

Joseph F. Cleveland, Jr.
Angélique M. McCall

CONTRACT

VEX Robotics & Cross the Road Electronics

April 2014

This contract (the "Contract") is made by and between Cross the Road Electronics, LLC ("CTRE"), a Michigan limited liability company, with offices at 56752 Mound Rd, Shelby TWP, MI 48316, and VEX Robotics, Inc. ("VEX"), a Texas corporation, with offices at 1519 Interstate 30 West, Greenville, TX 75402, as of the 21st day of April, 2014 (the "Effective Date").

1. Definitions

The following terms, when capitalized in the text of this Contract, have the following meanings.

- 1.1 **"Developed Controller"** means the electronic speed controller(s) which will be co-developed by VEX and CTRE under the terms and conditions of the contract herein.
- 1.2 **"FRC Legal Controller"** means speed controllers manufactured by either VEX or CTRE that are legal for the 2014 FRC competition season. Specifically, these are the Victor 888, Talon and Talon SR, Jaguar speed controllers, and the Motor Controller 29.
- 1.3 **"2015 Control System Products"** means the items listed in Addendum A.
- 1.4 **"FIRST Robotics Competition"** or **"FRC"** means the means the large scale high school robotics competition organized and operated by the US Foundation for the Inspiration and Recognition of Science and Technology.
- 1.5 **"FIRST Tech Challenge"** or **"FTC"** means the means the large scale high school robotics competition organized and operated by the US Foundation for the Inspiration and Recognition of Science and Technology.
- 1.6 **"Product Revenue"** means the amount received, less discounts, as a result of Developed Controller sales.
- 1.7 **"Non-Recurring Manufacturing Cost"** means any manufacturing costs that are one-time expenses for the purpose of manufacturing and testing of the Developed Controller (i.e. tooling and test fixtures).
- 1.8 **"Product Cost"** means the total cost of goods sold for the Developed Controller.
- 1.9 **"Product Profit"** means Product Revenue minus Product Cost.
- 1.10 **"Supplier"** means Innovation First Trading, Inc., which will act as a manufacturing agent on behalf of VEX in Asia. The agent fee will not exceed 8% of the Recurring Manufacturing Cost.
- 1.11 **"Recurring Manufacturing Cost"** means the cost associated with the manufacturing of a Developed Controller, each time that a Developed Controller is produced.
- 1.12 **"Qualified Third Party"** means a qualified company not affiliated with VEX or CTRE that purchases Developed Controllers for the purpose of resell. A company is considered qualified if the company has executed an exclusive distribution agreement approved by both parties and adheres to a minimum advertised price (MAP) mutually agreed upon by VEX and CTRE.

2. Term

The initial term of the Contract ("Initial Term") shall commence on the Effective Date and shall expire on April 30, 2017. The Initial Term shall automatically extend for up to five (5), one (1) year extensions (each a "Renewal Term") unless a party provides to the other party written notice of termination not later than the applicable execution dates set forth on Addendum C. The Initial Term and any Renewal Term(s) shall constitute the "Term" of the Contract.

3. Terms and Conditions

- 3.1. VEX and CTRE agree to jointly develop two (2) Developed Controllers specifically designed for the FIRST Robotics Competition. These Developed Controllers can be sold to any customer, subject to Section 3.9.
- 3.2. VEX will discontinue all manufacturing of their FRC Legal Controllers, starting on the Effective Date, except as noted in Addendum B.
- 3.3. CTRE will discontinue all manufacturing of their FRC Legal Controllers, starting on the Effective Date, except as noted in Addendum B.
- 3.4. VEX and CTRE agree to the responsibilities as described in sections 3.4.1 – 3.4.4.
 - 3.4.1. Both companies will be responsible for design engineering and will both fully participate in formal, and informal, design reviews.
 - 3.4.2. Actual task responsibilities will be mutually agreed upon between both parties, but will be divided equally to the best of VEX's and CTRE's ability.
 - a. Electrical detail design – CTRE lead
 - b. Mechanical detail design – VEX lead
 - c. Software design – Joint development. CTRE lead all CAN communication protocol development.
 - d. Sourcing and manufacturing engineering – VEX lead
 - e. Test fixtures – Joint development
 - 3.4.3. VEX will source, procure, and project manage production manufacturing.
 - 3.4.4. Both CTRE and VEX must sign off on all approval samples during engineering prototype, (EP), pre-production (PP), and production start (PS) phases of manufacturing.
 - 3.4.5. Both CTRE and VEX must approve supplier quotes before any Non-Recurring and Recurring Manufacturing Costs are incurred.
- 3.5. VEX and CTRE must mutually agree to inventory stocking levels before any production purchase orders are issued.
- 3.6. Developed Controller minimum retail price will be mutually agreed upon between VEX and CTRE.
- 3.7. VEX is responsible for initial payment to Supplier for all manufacturing costs incurred. CTRE will pay 50% of all manufacturing costs per section 3.8.
- 3.8. VEX and CTRE will equally share all Product Profit and manufacturing costs as follows:

- 3.8.1. Non-Recurring Manufacturing Cost will be split equally between VEX and CTRE. At the time of Supplier invoice for such costs, VEX shall invoice CTRE for their half to be paid within 30 days.
- 3.8.2. Recurring Manufacturing Costs will be split equally between VEX and CTRE. At the time of Supplier invoice for such costs, VEX shall invoice CTRE for their half to be paid within 30 days.
- 3.8.3. Profit share is calculated at the end of each month throughout the Term. VEX and CTRE will each receive 50% of the Product Profit for each developed Controller sold during the Term. The selling party will provide payment to the other party within 15 days after the close of each month.
- 3.9. Either party may sell Developed Controllers to a Qualified Third Party for the purpose of resell subject to a mutually agreed upon price between VEX and CTRE.
- 3.10. VEX and CTRE will mutually agree how to handle excess Victor 888, Talon, Talon SR, and Jaguar inventory prior to the start of the 2015 FRC Season.
- 3.11. CTRE agrees to supply VEX with 2015 Control System Products at prices listed in Addendum A.
- 3.12. CTRE and VEX agree to not design, manufacture, or assist in design for any speed controllers used for FTC without a mutually agreed upon joint development for any such controller.

4. Trademark Licenses

- 4.1. VEX hereby grants CTRE, and CTRE hereby accepts, subject to the terms and conditions of this Contract, a nonexclusive, fully paid-up, royalty-free, worldwide license to use the VEX marks listed in Appendix E ("VEX Marks") solely in connection with marketing and electronic and/or print advertising material directed to the Developed Controllers. The license with respect to the VEX Marks shall terminate upon any termination of this Agreement.
- 4.2. CTRE hereby grants VEX, and VEX hereby accepts, subject to the terms and conditions of this Contract, a nonexclusive, fully paid-up, royalty-free, worldwide license to use the CTRE marks listed in Appendix E ("CTRE Marks") in connection with marketing and electronic and/or print advertising material directed to the Developed Controllers. The license with respect to the CTRE Marks shall terminate upon any termination of this agreement.
- 4.3. Each party agrees to the Quality Control measures outlines in Section 14 below, and shall use the marks of the other party only in connection with the owning party's use guidelines. The parties further acknowledge and agree that its use of the marks of the other party shall inure solely to the benefit of the owning party.
- 4.4. THE MARKS ARE LICENSED TO THE OTHER PARTY "AS IS," WITHOUT ANY WARRANTIES OF ANY KIND. ALL WARRANTIES ARE SPECIFICALLY EXCLUDED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

5. Termination

- 5.1. Either party may terminate this Contract for cause, upon the other party's failure to cure a substantial or material breach of the terms of this Contract within thirty (30) days following delivery by the terminating party to the breaching party of written notice describing the breach.
- 5.2. The "Date of Termination" for section 5.1 shall be set forth in the notice of termination by a Party, and shall not in any case be earlier than thirty (30) days following the date of delivery of written notice of termination.

- 5.3. In the event that the Developed Controller is disallowed for use in FRC at any time during the term, through no fault of CTRE or VEX, this Contract will be terminated immediately per section 5.4.
- 5.4. Upon the termination of this Contract due to 5.3, VEX and CTRE will equally share all outstanding Initial Manufacturing Costs and all costs to deplete Developed Controller inventory. Inventory cost for each Developed Product will be equal to the calculated Product Cost.
- 5.5. Upon the termination of this Contract for any reason, the parties agree to use their commercially reasonable efforts to wind down the collaborative efforts undertaken in this Contract, with the objective of minimizing disruption for teams for the remainder of the competition season, and to discontinue use of the Marks of the other party, provided, however, that (i) neither party shall be under any obligation to recall any products or materials in which the Marks of the other party were included pursuant to the terms of this Contract; and (ii) each party shall have the right to (A) sell any Developed Controller products in inventory of such party or in process of manufacturing or delivery at the time of termination and (B) for a period of 180 days, distribute any advertising or promotional materials including the Marks of the other party which were printed and otherwise comply with the terms and conditions of this Agreement prior to the date of such termination.
- 5.6. Upon termination of this Contract, both parties may continue to manufacture and sell Developed Product for their own commercial reasons.

6. Limitation of Liability

EXCEPT FOR LIABILITY UNDER SECTION 17 BELOW, IN NO EVENT SHALL EITHER PARTY HAVE ANY LIABILITY TO THE OTHER PARTY, OR TO ANY THIRD PARTY, FOR ANY INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES, HOWEVER CAUSED, AND ON ANY THEORY OF LIABILITY, ARISING OUT OF THIS AGREEMENT, INCLUDING BUT NOT LIMITED TO LOSS OF ANTICIPATED PROFITS.

7. Payment and Other Sale Terms and Conditions

- 7.1. If CTRE purchases Developed Controller from VEX, VEX will Invoice CTRE in a mutually-acceptable format for the quantity of Developed Controllers shipped at a price per unit equal to 50% of the Product Cost. Payment terms are net thirty (30) days. Product Profit is calculated per section 3.8.
- 7.2. Each month during the Term, VEX and CTRE shall make available, via a mutually acceptable method, data regarding shipments made of the Developed Product to customers for each month.

8. Support

- 8.1. VEX shall provide online and phone support for Developed Product consistent with the support policies described on its website at <http://www.vexrobotics.com/support/>, as of the Effective Date.
- 8.2. CTRE shall provide e-mail and phone support for Developed Product consistent with CTRE support policies.
- 8.3. Additionally, VEX and CTRE agree that a common RMA tracking document will be used for all returns of the Developed Product. Either CTRE or VEX can issue an RMA for the Developed Product. All customer returns must follow the prescribed return policies of VEX and CTRE.

9. Secrecy

The parties have executed a separate confidentiality, nondisclosure agreement governing their conduct with respect to one another's confidential or proprietary information. Nothing herein shall affect the

terms and conditions of same.

10. Indemnification

- 10.1. VEX hereby agrees to indemnify and hold harmless CTRE, its officers, directors, employees, agents and representatives (collectively or separately, a "CTRE Indemnified Party"), from third party claims, damages, and expenses (including, with limitation, reasonable attorneys' fees) to the extent same arises from (a) any claim that the Developed Controllers infringe on the intellectual property rights of any third party; and/or (b) based upon the acts or omissions of VEX employees or agents. VEX shall have complete control of any such actions provided that CTRE shall cooperate with VEX in defense of such actions and may retain counsel of its own selection and at its own cost.
- 10.2. CTRE shall indemnify and hold harmless VEX, its officers, directors, employees, agents and representatives (the "VEX Indemnified Parties"), against any and all liability, claims, demands, losses, damages, judgments, expenses and/or costs (including reasonable attorneys' fees and related costs) (a) any claim that the Developed Controllers infringe on the intellectual property rights of any third party; and/or (b) based upon the acts or omissions of CTRE employees or agents. CTRE shall have complete control of any such actions provided that VEX shall cooperate with CTRE in defense of such actions and may retain counsel of its own selection and at its own cost.
- 10.3. VEX and CTRE shall share equally all liability, claims, demands, losses, damages, judgments, expenses and/or costs (including reasonable attorneys' fees and related costs) from third party claims, damages, and expenses (including, with limitation, reasonable attorneys' fees) to the extent same arises from (a) any product liability claim to the extent same directly relates to the Developed Controllers; (b) bodily injury (including death) to any person and/or damage to property, provided same directly results from the Developed Controllers.

11. Warranty

VEX and CTRE will warrant to consumers that the Developed Product will be free from defects in manufacturing, materials and workmanship for a period of three (3) months from the date of purchase. This warranty will cover normal use within the limits specified as stated in the applicable data sheets, and will not cover abuse, misuse, incorrect wiring, alterations, connector damage, or robot competition damage.

12. Ownership

- 12.1. CTRE acknowledges that VEX is not transferring to CTRE any intellectual property rights in the Victor or Jaguar that are owned by VEX, its affiliated entities and/or its licensors.
- 12.2. VEX acknowledges that CTRE is not transferring to VEX any intellectual property rights in the Talon and Talon SR that is owned by CTRE or its licensors now or in the future.
- 12.3. VEX and CTRE acknowledge that any intellectual property created during the development of the Developed Product is owned equally by VEX and CTRE including, but not limited to, all CAD data, design drawings, manufacturing drawings, fixture drawings, tooling, fixtures, firmware, embedded software, application software, and software tools for use on Developed Product only.

13. General Provisions

- 13.1. In all matters relating to this Contract, VEX and CTRE shall act as independent third parties. Neither party will represent that it has any authority to assume or create any obligation, expressed or implied, on behalf of the other party, or to represent the other party as agent, employee, or in any other capacity. Neither party shall have any obligation, expressed or implied, except as expressly set forth herein.

- 13.2. Neither party may assign any rights, duties, obligations or privileges under this Contract without the prior written consent of the other party, which consent shall not be unreasonably withheld. Notwithstanding the foregoing, a party may assign its rights, duties, obligations or privileges under this Contract without the prior written consent of the other party in connection with an acquisition, merger, sale or other transfer of all or substantially all of its business, assets or outstanding stock.

14. Quality Control

The parties shall not distribute any goods, provide services or any related materials (collectively, the "Materials"), either directly or via any third-party, that bear the Marks of the other party without receiving prior written approval of the manner in which the other party's Marks are depicted in representative samples of the Materials, which approval shall not be unreasonably withheld. The parties agree not to use the Marks of the other party in connection with any Materials that are defamatory or obscene, or that one would reasonably consider inappropriate. The parties shall at all times observe high standards of quality in the production and provision of the goods and/or services with which the Marks of the other party are to be used, and shall comply with all reasonable quality standards for same.

15. Notices

All notices required under this Contract shall be in writing and shall be sent to the other party via overnight delivery or certified mail, United States mail return receipt requested, at the address set forth above, unless written notification of a change of address has been provided by the other party.

16. Effect of Waiver

Any waiver by the parties of a breach of any term or condition of this Contract shall not be considered a waiver of any subsequent breach of the same or any other term or condition hereof.

17. Entire Agreement

This Contract constitutes the entire agreement of the parties and expressly supersedes any oral or written agreements between the parties up to and including the date of execution, excluding the confidentiality agreement referenced in Section 16 above. Any and all amendments, alterations or additions to this Contract must be in writing and executed by each party's duly authorized representative.

18. Applicable Law

THE VALIDITY, INTERPRETATION AND PERFORMANCE OF THIS CONTRACT WILL BE CONTROLLED AND CONSTRUED UNDER THE LAWS OF THE STATE OF TEXAS APPLICABLE TO CONTRACTS ENTERED INTO AND WHOLLY TO BE PERFORMED IN TEXAS, WITHOUT REGARD TO CONFLICTS OF LAWS PROVISIONS THEREOF.

19. Titles

The titles and subtitles used herein are not part of this Contract and are included solely for the convenient reference to the paragraphs hereof and shall not affect the interpretation of the various terms and conditions hereof.

20. Counterparts

This Contract may be executed in counterparts. For purposes hereof, a facsimile copy of this Contract, including the signature page hereto, shall be deemed to be an original. Notwithstanding the foregoing, the parties shall deliver original execution copies of this Contract to one another as soon as practicable

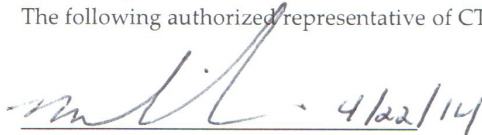
following execution thereof.

21. Signatures

This contract is not valid without the completed signatures & dates below of the authorized representatives of both CTRE and VEX.

CTRE Signature

The following authorized representative of CTRE hereby agrees to enter into the above contract with VEX.

A handwritten signature in black ink, appearing to read "Mike Copioli", followed by a horizontal line and the date "4/22/14".

Mike Copioli

Date

Owner, Cross the Road Electronics, LLC

CTRE Signature

The following authorized representative of CTRE hereby agrees to enter into the above contract with VEX.

A handwritten signature in black ink, appearing to read "Omar Zrien", followed by a horizontal line and the date "4/22/2014".

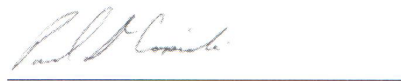
Omar Zrien

Date

Owner, Cross the Road Electronics, LLC

VEX Signature

The following authorized representative of VEX hereby agrees to enter into the above contract with CTRE.

A handwritten signature in black ink, appearing to read "Paul D. Copioli", followed by a horizontal line.

Paul D. Copioli

Date 4/21/2014

President, VEX Robotics, Inc.

Addendum A: 2015 Control System Products

Items listed below make up the FRC Control System products designed and manufactured by CTRE that are specified for use in the 2015 through 2019 FRC Competition Seasons.

Item	Retail Price	CTRE Price to VEX
Voltage Regulator Module	TBD	TBD
Power Distribution Panel	\$199	TBD
Pneumatics Control Module	\$89	TBD

Addendum B: FRC Legal Controllers Exempt from Clauses 3.2 & 3.3

The Table below lists FRC Legal Controllers that are either entirely exempt from clauses 3.2 & 3.3 and quantities that are currently in the manufacturing process that are allowed to be completed.

FRC Legal Controller	Qty Exempt	Reason for Exemption	Manufacturing Completion Date
Motor Controller 29	All	Used for VEX Classroom Kits	N/A
Talon SR	3,000	Currently in production	March 31, 2014

Addendum C: Contract Term

Contract Year (Season)		Duration	Execution Date
2015	Year 1	1 May 2014 - 30 April 2015	At Contract Signing
2016	Year 2	1 May 2015 - 30 April 2016	At Contract Signing
2017	Year 3	1 May 2016 - 30 April 2017	At Contract Signing
2018	Renewal 1	1 May 2017 - 30 April 2018	30 April 2016
2019	Renewal 2	1 May 2018 - 30 April 2019	30 April 2017
2020	Renewal 3	1 May 2019 - 30 April 2020	30 April 2018
2021	Renewal 4	1 May 2020 - 30 April 2021	30 April 2019
2022	Renewal 5	1 May 2021 - 30 April 2022	30 April 2020

Addendum D: Marks**VEX Marks:**

1. VEX ®
2. VEXpro ®
3. VEX IQ ®

CTRE Marks:

This website is the archived version of ctr-electronics.com.
Purchasing and account creation have been disabled though existing accounts may still log in and access information.

Free domestic shipping to lower 48 for all orders \$100 or more!

Welcome to CTR Electronics | My Account | Checkout | Log In | Search entire store here... Search | Cart: 0 product \$0.00

HOME | PRODUCTS | **CTR** | ABOUT-US | CONTACT
ELECTRONICS

CATEGORIES

Control System (12) -
Motor Control (3)

.NET Gadgeteer (13) +

Cabling (26) +

Adapters (8)


Battery Testing (3)

Sensors (5) +

Tools (3)





FALCON 500 POWERED BY TALON FX

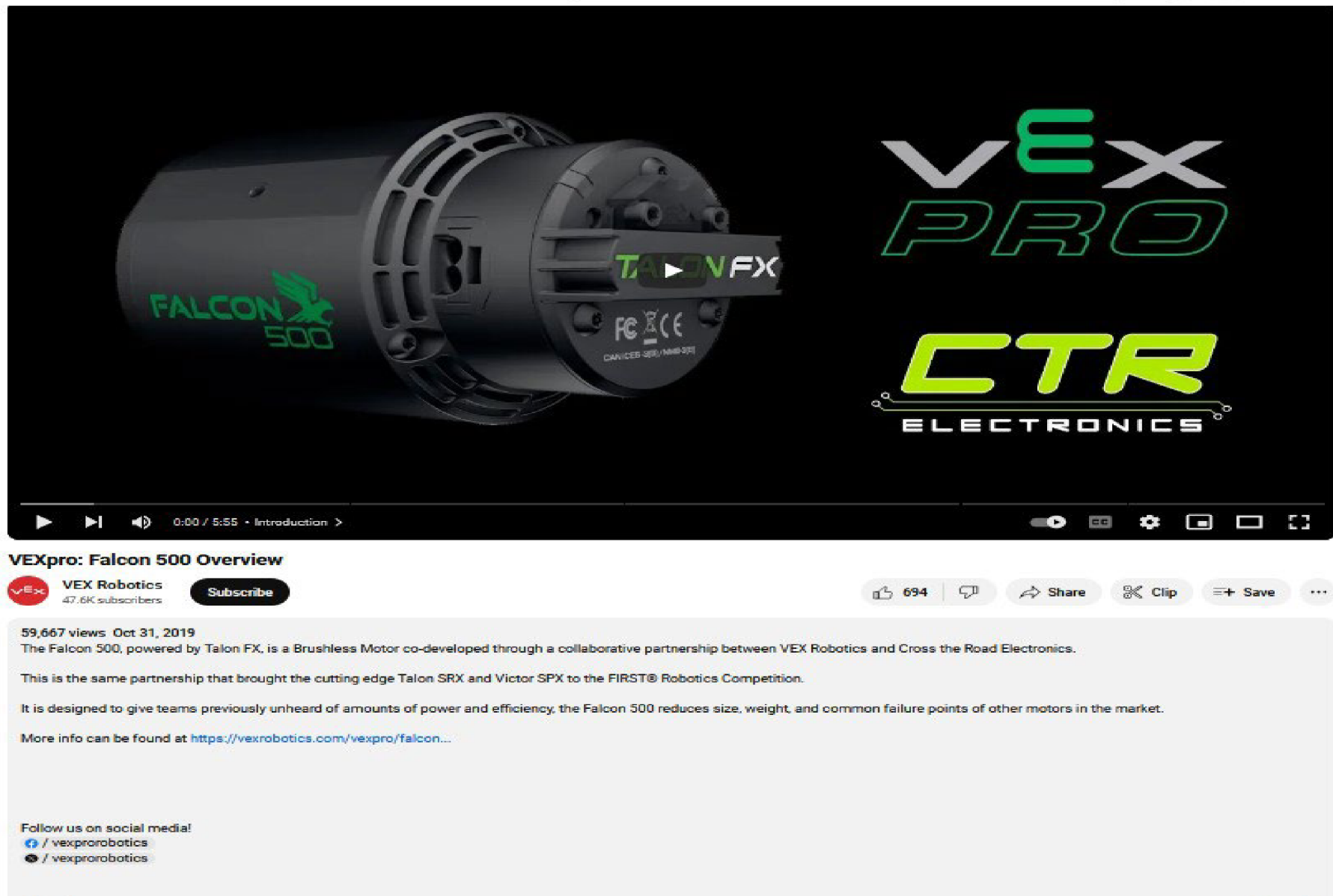
P/N: 19-708850



Availability: **Out of stock**
\$179.99

Quick Overview
The Falcon 500, powered by Talon FX, is a brushless motor with an integrated controller co-developed through a collaborative partnership between VEX Robotics and Cross the Road Electronics.





The image shows a video player interface for a video titled "VEXpro: Falcon 500 Overview". The video content features a black brushless motor with "FALCON 500" and "TALON FX" branding. To the right of the motor, the "VEX PRO" and "CTR ELECTRONICS" logos are displayed. The video player includes a progress bar at 0:00 / 5:55, a play button, and various control icons. Below the video, the channel name "VEX Robotics" with 47.6K subscribers is shown, along with a "Subscribe" button. Engagement metrics show 694 likes and a comment icon. Sharing options for "Share", "Clip", and "Save" are available. The video description states that the Falcon 500 is a brushless motor co-developed by VEX Robotics and Cross the Road Electronics, designed for high power and efficiency. It also provides a link to the VEX Robotics website for more information. Social media links for Facebook and Twitter are listed at the bottom.

VEXpro: Falcon 500 Overview

VEX Robotics
47.6K subscribers **Subscribe**

694 |

Share Clip Save

59,667 views Oct 31, 2019

The Falcon 500, powered by Talon FX, is a Brushless Motor co-developed through a collaborative partnership between VEX Robotics and Cross the Road Electronics.

This is the same partnership that brought the cutting edge Talon SRX and Victor SPX to the FIRST® Robotics Competition.

It is designed to give teams previously unheard of amounts of power and efficiency; the Falcon 500 reduces size, weight, and common failure points of other motors in the market.

More info can be found at <https://vexrobotics.com/vexpro/falcon...>

Follow us on social media!

/vexprorobotics

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0



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[Home](#) / [All Products](#) / Falcon 500 Powered by Talon FX

Falcon 500 Powered by Talon FX

SKU: 19-708850



\$219.99

Maximum Purchase: 20 units

Resources



[Software](#)



[Hardware User Manual](#)



[CAD & Drawings](#)



[Firmware](#)



\$219.99



Description

The Falcon 500 powered by Talon FX is a brushless motor with an **integrated motor controller** and **high-resolution encoder**, custom designed specifically for the FIRST Robotics Competition, through a collaboration between Cross the Road Electronics and [VEX Robotics](#).

AVAILABILITY: Falcon 500s are out of stock for the 2023 season. See our availability page here:


<https://store.ctr-electronics.com/falcon-500-2023-availability/>

NOTE: There is a known issue where 2022 (and earlier) Falcon 500 motors may not have adequate Loctite applied to the shaft retention screws.

See the [blog post with a message from VEX](#).

Features

Falcon 500 / Talon FX Features:

- A **motor** and **motor controller** assembly **all in one** product
- **Integrated** rotor sensor (2048 steps per rotation)
- **CIM/Mini-CIM** hole compatibility (2" Hole Pattern)
- Interchangeable, keyless, spline shafts
- **Full aluminum case** with **cooling port**
- **Reverse polarity** protection (fewer costly wiring mistakes)
- **LED indicators** blinking proportionately to output speed for easier debugging.
- **Brake** configuration via **Brake/Coast button**
- **PWM Calibration** via **Brake/Coast button**
- Trapezoidal commutation
- **CAN bus** or **PWM** control **automatically detected** over the same wires (pioneering feature of CTR-Electronics controllers)
- **Limit switch** feedback and auto-neutral . Can also auto-zero rotor position.
- **Follower Mode** - Talon can auto follow output of another
- Use **Rotor Sensor** or **supported CAN bus sensors** like **CANcoder** for **position/velocity/closed-loop features**.
- **Integrated PID** control running at 1Khz (with/without **voltage compensation** with **tunable gains** kP, kI, kD, kF)
- **Velocity measurement** with **user-configurable filter**
- **On-board** motion control using **Motion Magic**, which provides **automatic motion-profile** control via simple configuration.
- **Independent limits** for **supply current** and **stator current**
- **CAN FD Compatible** and is **supported by CANivore**.
- **Robust bootloader** and **reliable field-upgrade** (no physical button required, no "stuck states" that requires user intervention)
- **CAN FD Compatible**  and is **supported by CANivore**

Graphical Software and API:

- [Phoenix v5 API](#) compatibility
- [Phoenix Pro API](#) compatibility
- Users can [download](#) **software API binaries** on our **reliable Maven server** (99.9% reliability)
- **Phoenix Tuner v1** support (Set Name, Device ID, Field-upgrade, Self-test, etc.)
- **Phoenix Tuner X** support (Set Name, Device ID, Field-upgrade, Self-test, etc.)
- **Desktop Simulation Support (Phoenix v5 and Phoenix Pro)**
- **Hardware-Attached [Simulation](#) Support** (drive Falcons from PC using CANivore USB-to-CAN).

[Phoenix Pro](#) (new API available in 2023) :

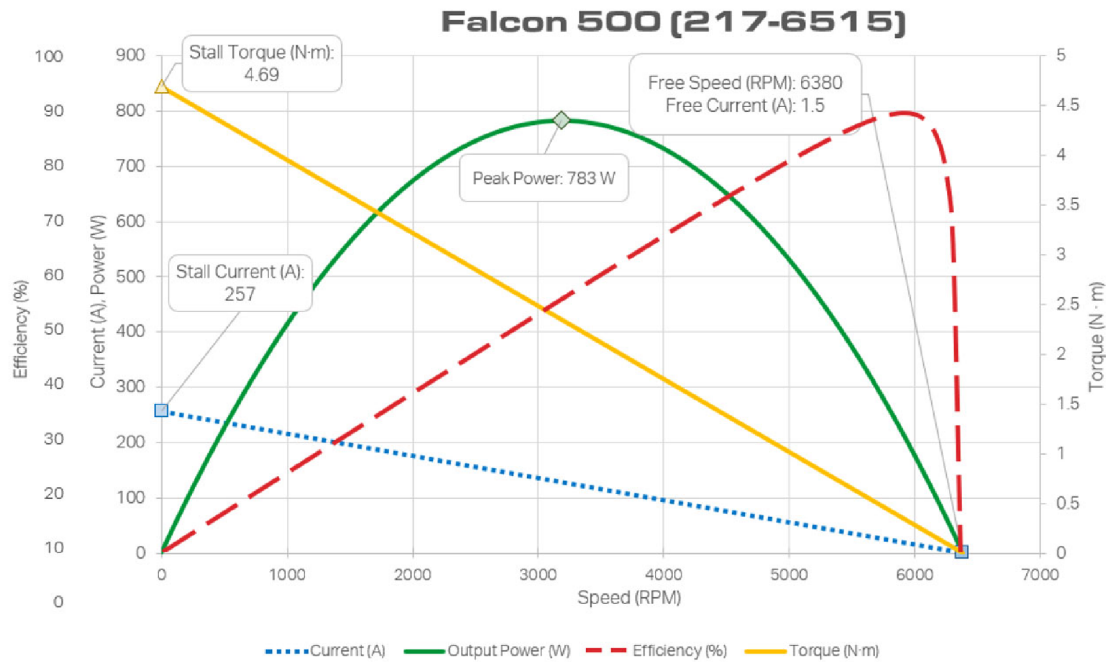
- Supports FOC Commutation (which increases peak power by ~15%)
- **API and firmware** features all use **canonical units**

- [New Documentation](#) tailored for Pro use
- **Verbosely named control requests** replaces the flat API surface of Phoenix v5
- Pick your **output types**: **duty-cycle**, **voltage**, **current-amps**
- Supports several motor control modes: **Open-Loop**, **Position**, **Velocity**, **Motion Magic**
- **Improved velocity filter**: No config required, **Kalman** filter works **automatically**.
- **Improved PID control**: new **kS** gain, **ContinuousWrap** added for **swerve azimuth**
- **Improved Motion Magic**: New **Jerk Config**, **ContinuousWrap** added
- **Improved Remote CANcoder feature**: **CANcoder** and **rotor** are **automatically fused**, **reduces effect of backlash**, **no startup complexity** on sensor bootup.
- **Improved Limit Switch**: **auto-set position** on limit to **custom nonzero** values
- **Improved Follower**: Follower will **match commutation** type and **output type** (duty-cycle vs torque-current) automatically.
- **CANivore Timesync**: **Synchronize sensor timestamps across many devices** - great for **swerve odometry**
- **C++/Java supported**. [LabVIEW beta is available](#)
- [Hardware Licenses](#) are downloaded **per device** or **per CANivore** depending on preference.

Motor Performance

Trapezoidal Commutation

When using Phoenix v5 API, the motor performance follows the curve below.



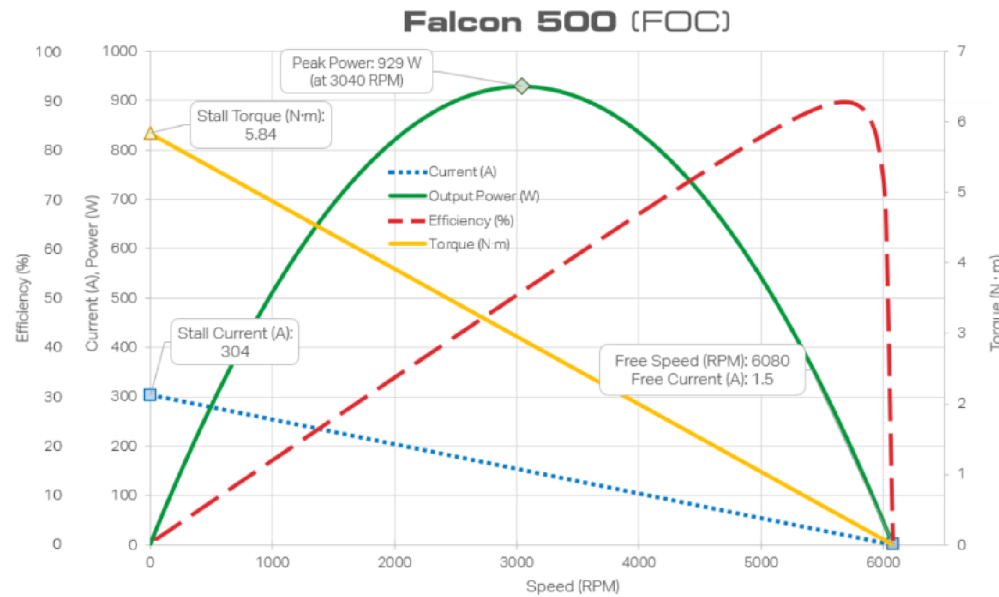
Field Oriented Control (FOC)

When using Phoenix Pro API, user can select between the FOC curve below, or the Trapezoidal curve above.

Benefits of FOC:

- **More Efficient:** The Falcon 500 will use less electrical power for the same mechanical power result.
- **Greater Acceleration:** Higher maximum torque allows for greater acceleration.
- **Easier to Control:** More accurate & smooth control of the motor in all uses because of consistent torque. This results in easier/faster tuning to reach the desired performance.
- **Higher RPM When Loaded:** Higher power generally results in higher motor RPM when the motor has a load to drive. *Note that free-speed maximum RPM is slightly lower (see motor curves above and below for full profile).
- **Flexible Control Types:** Multiple output types lets you choose the closed-loop output (Voltage, Duty Cycle, or Torque) while still gaining the power benefits of FOC.

Sounds too good to be true? Compare the FOC Motor Curve below to the standard Motor Curve above!

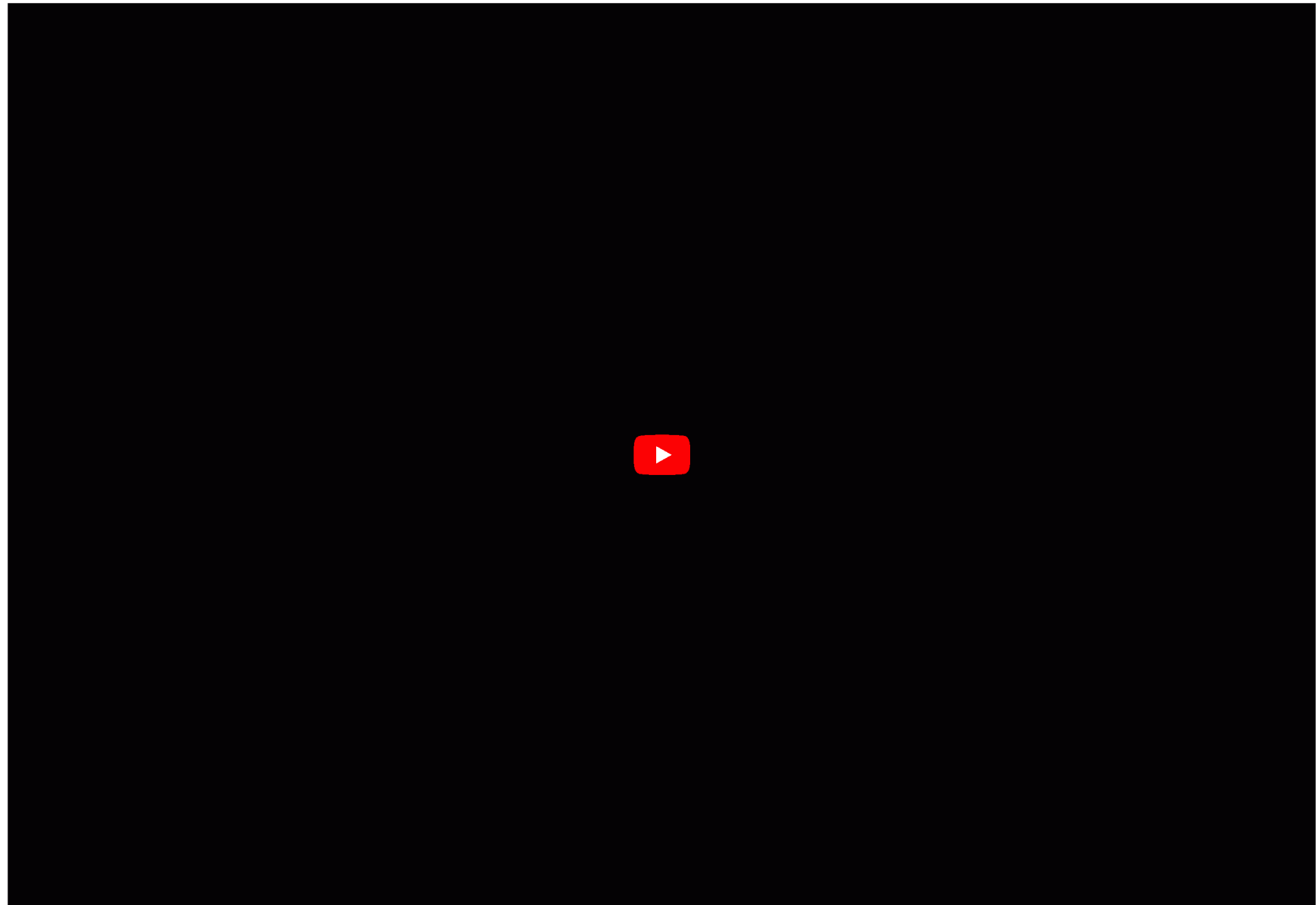


Technical Specifications

Kit Contents	Falcon 500 with Integrated Talon FX, Shaft Spacers, Power, Ground, Output, CAN cables come pre-attached
Nominal Voltage	12VDC
Material Type	Cast Aluminum
Material Finish	Black Anodized for superior performance & heat dissipation.
Dimensions	60mm (2.36") Dia. X 81mm (3.18") Long
Supported Communication Protocols	PWM, CAN
Direct Limit Switch Input	Yes
PWM Input Pulse (high time)	1 - 2 ms nominal
PWM Input Rate (period)	2.9 - 100 ms
Minimum Throttle (Deadband)	Adjustable 0.1%-25%
Free Speed RPM/Current*	6380 RPM/1.5A
Stall Current/Torque*	257A/4.89Nm
Power @ 40A/12VDC*	400W Output (83% efficiency)
Peak Efficiency*	256W Output (87% efficiency)
Built-In Encoder Feedback	2048 Steps Per Rotation
P/N	19-708850

* Measured using Trapezoidal Commutation. When using Phoenix Pro, user can switch between Trapezoidal and FOC, see motor curves for performance changes.

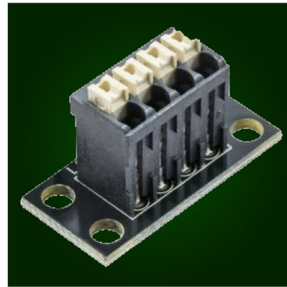
Videos



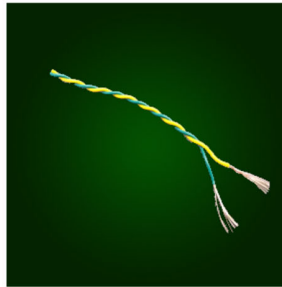
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CANcoder**\$69.99 - \$89.99**[Choose Options](#)

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SKU: 15-676700

CAN Bus Cable**\$0.48 - \$155.00**[Choose Options](#)

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Limit Switch Wire Assembly**\$0.99**[Add to Cart](#)

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120 Ohm**\$4.99**[Add to Cart](#)

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Falcon 500



Falcon 500

\$219.99

Out of stock
SKU#: 217-6515

Works with **PRO** products and accessories.
FRC legal.

The Falcon 500, powered by Talon FX, is a Brushless Motor co-developed through a collaborative partnership between VEX Robotics and [Cross the Road Electronics](#). This is the same partnership that brought the cutting edge Talon SRX and Victor SPX to the FIRST® Robotics Competition.

It is designed to give teams previously unheard of amounts of power and efficiency, the Falcon 500 reduces size, weight, and common failure points of other motors in the market.

Learn more [here](#).

Additional features include:

- 400W Power @ 40A / 12VDC

• Efficiency of 87%

Help

- Integrated Talon FX Motor Controller
- 14T Splined Output Shaft
- Optional cooling port
- 1.1 lbs, total weight

Case 3:23-cv-02586-D

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Note: Due to microchip supply chain delays we are now out of stock for the 2023 season.

[Notify me when this product is in stock](#)

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Kit Contents

- (1) Falcon 500, powered by Talon FX (Falcon Motor Long Shaft pre-installed)
- (6) 1/16" Long Falcon Shaft Spacers
- (4) 1/8" Long Falcon Shaft Spacers
- (2) 1/4" Long Falcon Shaft Spacers
- (1) 3-Wire Retaining Clip

Docs & Downloads

Drawing

Material Type

Weight

Other Info

CAD Files

We found other products you might like!



Falcon 500 Hardware Kit
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\$1.49



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Works with **PRO**
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VersaPlanetary Motor
Couplers
Works with **PRO**
Starting at
\$1.99

Case 3:23-cv-02586-D

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Falcon Spline to 1/2"
ThunderHex Adapter

Works with **PRO**

\$4.49



20 DP Motor Pinions (16
Choices)

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As low as **\$4.49**



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